

Structure of the limit value file

| Header | NO | KoNr | Min | Max | Unit | Text |
|---------------------|----------|-------|-------|-------|------|------|
| Name EAK | #EAK30# | | | | | |
| 1. measuring point | 01 | 27 | 055,0 | 115,0 | 1■ | 01 |
| 2. measuring point | 02 | 03 | 022,0 | 025,0 | 1■ | 02 |
| | .. | .. | .. | .. | .. | .. |
| 16. measuring point | 16 | 14 | 000,0 | 100,0 | 21 | 13 |
| | .. | .. | .. | .. | .. | .. |
| 18. measuring point | 18 | 15 | 000,0 | 100,0 | 22 | 14 |
| | .. | .. | .. | .. | .. | .. |
| 29. measuring point | 29 | 26 | 033,0 | 047,0 | 1■ | 23 |
| Difference | M=20% | P=10% | | | | |
| Name EAK | #EAK30S# | | | | | |
| 1. measuring point | 01 | 27 | 055,0 | 115,0 | 1■ | 01 |
| | .. | .. | .. | .. | .. | .. |
| End | ## | | | | | |

The data record for an EAK starts with „# EAK name #“ and fills a line for every measuring point. The end of each type of EAK is the deviance between MESSAB without dummy wheel and MESSAB with dummy wheel „M=20%“ (in percentage) respectively „M=10mV“ (absolute) and the allowed deviance between MESSAB without dummy wheel and PEGUE „P=10%“ (in percentage) respectively „P=10mV“ (absolute). The limit value file ends with “##”. The single columns are separated by a tabulator; it is not allowed to use space characters or blank lines as separation.

The columns “NO”, “KoNr”, “Unit” and “Text” consist of two characters, whereas the columns “Min” and “Max” consist of five characters. The symbol „■“ in the column “Unit” marks a space character. It is used as a replacement and means to lower (1) or to lift (2) the dummy wheel. There are three numbers before the comma and one after it in the columns “Min” and “Max”.

- The column “NO” defines the number of measurements in manual mode. In automatic mode the process runs line by line.
- The column “KoNr” describes the switch setting in the Thales measuring kit.
- Listed in the column “Min” is the permissible minimum value; listed in the column “Max” is the permissible maximum value.
- The column “unit” consists of two numbers: The first number identifies the operation mode, the second number provides indications for the dummy wheel.

Operation mode: 1 = Volt | 2 = mVolt | 3 = +(mVolt) | 4 = -(mVolt) | 5 = Hertz
(Exception at RSL: KoNr 18 | 19 | 20: 9 = Volt)

- The column “Text” serves to classify the records (records can’t be changed).

Tester for Axle Counter ZP 30

SICO 2049

MANUAL



9 Revising the Limit Values

The limit values stored in the tester can be readout and revised by the user. Thus, the user itself can update the tester according to the specifications of the plant manufacturer.

Export of the limit values

Take an empty, and for better results recently formatted memory card to export the limit values stored in the tester. Put the memory card in the tester and switch it on. Select "Settings", then "Limit values" and confirm your selection. The date of the stored file with the limit values is displayed. Press the button "save" to install a file named "CONFIG.OLD" on the memory card. This file contains the limit values for all axle counter types, which are currently stored in the tester.

Import of the limit values

It is necessary to have the file with the limit values named "CONFIG.INI" on the memory card to update the limit values. Switch on the tester, select "Settings", then "Limit values", and confirm your selection. Choose the file with the limit values (the file name is displayed without the suffix "INI"). Now the date of two files with limit values is displayed: on the one hand side the file stored in the tester and on the other hand side the file stored on the memory card. Press the button "Save" to copy the limit values. The display informs you after the limit values were transferred successfully.

Modify the limit values

The limit value file needs a certain format to import it in the tester. Please follow this instruction; else there will be an error report when importing the limit values!

Modifications are only permissible in the columns "Min" and "Max" to guarantee an error-free operation. Furthermore, the allowed deviance between MESSAB without dummy wheel and MESSAB with dummy wheel and the allowed deviance between MESSAB without dummy wheel and PEGUE can be adapted for each type of EAK.

After exporting the limit values from the tester, open the file with any editor. Save the file after you have finished the modification of the minimum and maximum values. Before importing the file into the tester, change its name from "CONFIG.OLD" to "CONFIG.INI".

8 Definition

| | | |
|--------|---|--------------------|
| MESSAB | - | Received voltage |
| PEGUE | - | Monitoring voltage |
| ZP | - | Detection point |
| EAK | - | Connection box |

Dear customer,

Thank you for choosing the Tester SICO 2049 for Axle Counter ZP 30. You have purchased a high quality technical device used in the industrial field. We hope that all of your expectations are met and that we are able to support your work.

This product was designed, produced and tested with due care and according to the applicable European Standards. If the device is yet not working correctly under the conditions given in this operating manual, please contact the manufacturer:

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Signal Concept GmbH confirms the conformity of the device according to the directives given by the European Parliament and Council 2004/108/EC (EMC-Directive), 2006/42/EC (Machinery Directive), 2006/95/EC (Low Voltage Directive), 85/374 EEC (Product Liability Directive), 2002/95/EC (RoHS Directive) and 2002/96/EC (WEEE Directive).



Signal Concept GmbH holds a Quality Management (DIN EN ISO 9001:2015), which is checked annually by Bureau Veritas Quality International Deutschland GmbH as accredited organization.

This manual serves as an introduction to your new device. Please read it carefully for your own protection. Furthermore, it enables you to use all functions properly. Please follow all directions and hints to avoid accidents with persons and damages of the device.

The manual is part of the device. The user has to keep it until the disposal of the device. When handing the device to other users, the manual must be given too.

Agreement for Field Testing:

| |
|--|
| Tested: Approved: Seen: Version 1.0 |
| Eisenbahn-Bundesamt Zentrale Büro Berlin |
| GZ: 224.52 Smz SICO (39/06) Berlin: 30 June 2006 Signed Stauch |

| | | |
|---------------|------------|---|
| Dokument No.: | 2049 B | <i>Replacement for document 2049 B, ed. 2.06 dated 25.03.2015</i> Copyright © 2008, Signal Concept GmbH. All rights reserved. All data, properties and descriptions given in this operating manual may be changed at any time without giving notice. For the latest version please visit www.signalconcept.com |
| Edition: | 3.02 | |
| Date: | 14.05.2018 | |
| Author: | Wendt | |

Accessory

Included in the delivery are the following parts. Please check if all of these components were supplied. If parts are missing or damaged, please contact your reseller.
If you wish to purchase spare parts or additional accessory, you can order the items from your reseller.

| Pieces | Item name | Order number |
|--------|--|--------------|
| | Tester SICO 2049 consisting of: | 110043 |
| 1 | SICO 2049 Display unit | 110001 |
| 1 | SICO 2049 Measurement adapter | 110019 |
| 1 | SICO 2049 Dummy wheel | 110003 |
| 1 | SICO 2049 Cable set 1 * (for screw type terminal) | 110017 |
| 1 | SICO 2049 Cable set 2 ** (for slot terminal) | 110018 |
| 1 set | SICO 2049 Adapter sockets for Cable set 2 | 110012 |
| 1 | SICO 2049 Cable set 3 ** (for test probes) | 110029 |
| 1 set | SICO 2049 2mm Test probes for Cable set 3 (red & black) | 110028 |
| 1 | SICO 2049 EAK-Adapter Plug *** | 110037 |
| 1 | SICO 2049 Memory card (located in the Display Unit) | 110006 |
| 1 | SICO 2049 Card reader USB | 110007 |
| 2 | SICO 2049 Accumulator NiMH, type C | 110008 |
| 1 | SICO 2049 Transport case | 110009 |
| 1 | SICO 2049 Toolkit, consisting of: 1 Screwdriver 4x100 1 Screwdriver 2,5x75 1 Screwdriver Pozidriv no. 2 1 Spanner SW13 1 Screwdriver Torx T40 | 110010 |
| 1 | SICO 2049 Manual | 110011 |
| 1 | SICO 2049 Acceptance test certificate according BS EN 10204 | --- |

* Cable set 1 connecting to EAK30, EAK30S, EAK30C, RSL

** Cable set 2 and 3 connecting to EAK30C-NT, EAK30CA-2, EAK30H, EAK30K

*** The EAK-Adapter Plug is needed for EAK30K

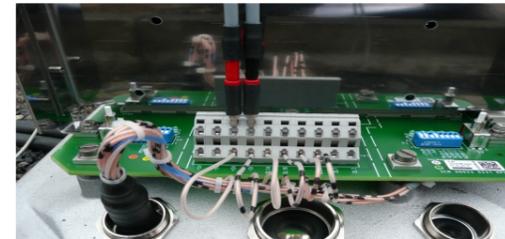
Optional Accessory

| Item name | Order number |
|--|--------------|
| SICO 2049 Adapter socket red | 110015 |
| SICO 2049 Adapter socket black (suitable and certified for long-term installation in EAK) | 110016 |

Connection to the detection points ZP 30C-NT



Measuring transmitter voltage
and transmission frequencies
Clamp X107: Sk1SA and SK1SB
Clamp X133: Sk2SA and SK2SB

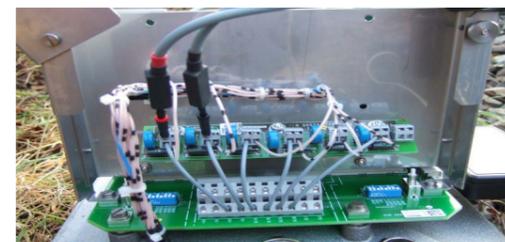


Measuring supply voltage
Clamp X101: +SV and -SV

Connection to the detection points ZP 30C-NT with lightning protection



Contacting the transmitter voltage
Clamp X107: Sk1SA and SK1SB



Measuring supply voltage
Disconnection of additional circuit board
Clamp: 32 and 34

7.4 Connections

Connection to the detection points ZP 30, ZP 30S and ZP 30C



Measuring transmitter voltage
and transmission frequencies
(transmission frequencies ZP 30C only)



Measuring supply voltage

Connection to the detection points ZP 30H



Contacting the transmitter voltage
Clamp Sk1: S1 and S2
Clamp Sk2: S1 and S2



Measuring supply voltage
Disconnection of additional circuit board
clamp: +V_F and -V_F

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1 Safety Instructions

The Tester SICO 2049 for Axle Counter ZP 30 is to be used exclusively according to the description in this manual. Otherwise, the protection given by the tester can be limited.

Particularly, users have to take care that they have established all necessary connections between the tester's components before contacting the axle counters!

! Warning !

To avoid the damage of persons or products, mind the following guidelines:

Consider the valid guidelines for working on railway facilities when operating the Tester SICO 2049.

The junction box and the cables attached have to be regarded as energized!

Do not use a damaged tester. Before using the tester, check the housing for outer damages.

Check accessories (connection line of measurement adapter and cable set) concerning visible insulation faults. Before using the tester, replace damaged accessory.

Do not use the tester in environments with explosive gases, steam or dust.

Do not use the tester when it shows a malfunction. The protection devices could be affected. In case of doubt send the tester to the manufacturer or to a company authorized by the manufacturer for checking.

The manufacturer or companies authorized by the manufacturer are the only ones being responsible for repairing.

Voltages higher than 42 V occur at some parts inside the tester. For that reason do not start or run the tester while it is opened.

Qualified professionals only may use the tester.

Do not drop or shock the tester.

Disposal

Electric and electronic devices must not be given to the general rubbish, since they mostly contain noxious elements. Instead dispose them at the collecting points for special waste.

Measuring temperature

Measuring, display, and storing of the outside temperature are given in °C.

Measuring fault: $\leq 2^{\circ}\text{C}$

7.2 Inspection

It is recommended to have the device inspected every 2 years.

7.3 Measuring Faults

| Function | Testing range | End of interval | Accuracy <small>± (% of measured value + % of end of interval's value)</small> |
|---------------------|---------------|-----------------|--|
| Direct voltage | 1 | 0.100 V | 0.5 + 1.0 |
| | 2 | 1.000 V | 0.2 + 0.3 |
| | 3 | 10.00V | 0.2 + 0.3 |
| | 4 | 150.0V | 0.3 + 0.2 |
| Alternating voltage | 1 | 1.000 V | 0.2 + 0.3 |
| | 2 | 10.00V | 0.2 + 0.3 |
| | 3 | 90.0V | 0.2 + 0.3 |
| Frequency | 1 | 35 kHz | 0.1 + 0.1 |

A displayed measured value will be mathematically rounded.

Rounding by comparison of limit values (example):

The displayed measured result is 1.14 V. The limit value for the maximum voltage is 1.1 V. The display unit rounds the value to 1.1 V and compares it with the limit value. No faulty measurement will be displayed.

In case the measured result is 1.15 V (rounded 1.2 V), the measurement is marked as faulty.

7 Technical Data

7.1 General

| | |
|-----------------------------|--|
| Input resistance | Measurement adapter 2049 3: $R_E \geq 200 \text{ k}\Omega$ Measurement adapter 2049 6: $R_E \geq 2 \text{ M}\Omega$ |
| Protection class | II |
| IP code display unit | IP 54 |
| IP code measurement adapter | IP 42 |
| Operating time | > 8 hours at 20°C and fully loaded batteries |
| Operating temperature | -20°C ... +55°C |
| Display | 128 x 64 Pixel, illuminated |
| Buttons | Membrane keyboard, 4 buttons |
| Power supply | 2 batteries 1.5 V, type C or 2 accumulators 1.2 V |
| Dimension transport case | 210 x 250 x 360 mm |
| Weight (accessory included) | 4.9 kg |

Measuring current voltage

| | |
|------------------------------|---|
| Testing range: | 0 V ... 150 V (automatic selection of testing range, automatic polarity recognition) |
| Resolution 0.0 V ... 1.0 V | 1 mV |
| Resolution 1.0 V ... 150.0 V | 0.1 V |

Measuring alternating voltage(1 ... 35 kHz)

| | |
|-----------------------------|---|
| Testing range: | 0 V ... 90 V (automatic selection of testing range) |
| Resolution 0.0 V ... 1.0 V | 1 mV (with cable sets 10 mV) |
| Resolution 1.0 V ... 90.0 V | 0.1 V |

Measuring frequency

Starting from an input voltage's amplitude of at least 150 mV and none overlaying frequencies, the signal can be evaluated as follows:

| | |
|----------------|--|
| Testing range: | 1 kHz ... 35 kHz (depends on AC-testing range) |
| Resolution: | 10 Hz |

2 Working Principle

The Tester SICO 2049 was developed to carry out the compulsory tests as well as to do settings and error detection at Thales axle counters ZP 30. For that purpose the tester measures automatically the selected voltage and frequency, compares them with the reference value, and saves the data on a memory card for further processing. Comparative measurements base on measurement data by the manufacturer or by DB AG (DS 892).

2.1 Supported Axle Counter

The tester can be used for the following detection points by Thales:

| | |
|---|---|
| ZP 30 ZP 30S ZP 30C Sk30 / Sk30H ZP 30C-NT ZP 30H ZP 30K 24V / 120V ZP 30CA-2 RSL (Wheel sensor) | Note: After having carried out the measurements the limit values of the records have to be compared with the valid limits of Thales. In case of deviation it is possible to adapt the limit values stored in the device (ref. chapter 9 Revising the Limit Values). |
|---|---|

2.2 Overview of the Single Parts

2.2.1 Display Unit

The graphic display of the display unit reports instructions for the user, measurement data as well as warnings and failure notes.

The user operates the unit with the four buttons around the display. A button's respective function is shown in the display.

The power switch in the right upper corner is specially marked. A short press on the button starts the unit. A longer press on the button shuts down the running unit.

The measurement adapter is connected to a 5-pole socket on the front side.

All measurements follow the same method. The active measuring point is shown on the display or chosen by the user. The display unit sends a signal to the measurement adapter. A connection between the adapter and the test point is established to measure the applying voltage and / or frequency. The result is sent to the display unit, shown on the display, and saved in a cache. After finishing the measurement, all data in the cache is saved to the memory card (not in adjustment mode).

Note: LC-displays work according to the temperature. Regarding its function the display is specified to -20°C. Yet an impairment of the readability and a decreasing update speed in extreme temperatures cannot be excluded.

2.2.2 Memory Card

To guarantee the correct working of the tester, do use **the enclosed memory card only** or memory cards you have bought from Signal Concept GmbH. Our memory cards fulfill the requirements concerning temperature range and memory size.

We do not guarantee the working of the device according to this manual if other memory cards are used.

Note: Insert or remove the memory card only after the shutdown of the unit. Otherwise, the unit would not identify the memory card!

Insert the memory card:

Open the screw cap on the right hand side of the tester's back side. Additionally, the screw cap is marked. Insert the memory card in the slot. The marked corner points upwards, the contacts downwards. The card has to snap with **soft** pressure.

Remove the memory card:

A soft pressure to the card unlocks it. Now it can be removed

Functions of the memory card:

The memory card can be used like a computer drive, i.e. directories and data can be generated and deleted. The card reader can be connected to the USB port of a computer. The measured data will be saved as follows: The file folder "SICO" is automatically generated on the memory card (unless already existing). Every entered detection point number (see 4.2 Entries) gets a directory <ZP-No.> in the folder "SICO". The measured data is saved in a file named <JJMMTT.xls>, date of the measurement. The saving is not realized in the adjustment mode. More than one measurement per day at the same detection point will be named with an additional consecutive number. Defective measurements, such as measured data differing from limit values, will be marked with "F".

Example:

| | | |
|-----------------|--------------|---|
| Folder name: | 12345 | detection point number 12345 |
| Existing files: | 060814.xls | measured data of detection point 12345, measured 14.08.2006 |
| | 060814_1.xls | 2nd measurement at the same day |
| | 060715F.xls | measured data 15.07.2006, defective measurement |

Preparing the memory card on your PC:

The directory with the already known detection points can be generated in advance at the computer. Only, the corresponding detection point has to be chosen before measurement.

Note: The directory's name is limited to 18 characters only and excludes ä, ö, ü as well as special characters. The directory has to be located in the folder "SICO"!

Directories with names of more than 18 characters are not shown. Special characters are replaced by question marks.

Connect the card reader to a free USB-port of your computer and insert the memory card. After a short moment the Windows Explorer gives the notice "removable medium" (please follow the notes about the different operating systems at the card reader's packaging). If not already done, generate a folder "SICO" on the removable medium. Now generate the single directories giving them the names of the detection point numbers.

6 Failures

The correct functioning of the unit is inspected regularly. Information about failures is shown in the display.

Further possible failures and their causes:

| Failure | Solution | Page |
|--|--|------|
| Unit cannot be switched on. | Check the batteries for charging and the contacts for cleanliness. | 13 |
| Unit does not display data during measuring. | Check the display unit's connector for fouling and check if the cables of the measurement adapter possibly are broken. | 9 |
| Unit reports difficulties with memory card. | Has the memory card been inserted correctly? It is not the memory card provided by Signal Concept GmbH or it was wrongly formatted. | 7 |
| Data of memory card can not be displayed. | Probably you have processed and stored the file on your computer. The display unit just shows the data which was stored by it. | 7 |

If the device is yet not working correctly under the conditions given in this operating manual, please contact the manufacturer:

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04416 Markkleeberg
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 Fax: +49 (0) 34297 143913
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5.4 View Measured Data

You can open the stored protocols and view the data on the display.

Attention!

You cannot display data which was already processed and stored on your computer!

In the selection mode all data is arranged alphabetically and in ascending order. You can store and display a maximum of 50 detection point numbers with a maximum of 50 test reports.

We recommend storing only little data on the memory card. Store the protocols on your computer regularly!

1. Select Detection Point Number

Select one of the detection point numbers and affirm with ✓.

2. Select test report

Select the test report you want to see and affirm with ✓. Now you can choose the single measurements with the cursor. Faulty results flash.

Example:

Generating the detection point with the number 12345: First, generate a new directory naming 12345 in the folder "SICO" on your memory card. Before measuring you can choose the directory in the tester's display.

Particularities:

The memory card can store a maximum of 50 directories with a maximum of 50 test reports. Warnings concerning reaching the maximum are given in advance via the display. Store the data on your computer.

You can reformat the memory card in the Windows Explorer. Use the option "FAT" or "FAT16" only! **Please be aware that all stored data is deleted!**

We recommend:

Store the memory card data periodically on your computer. Less data on the memory card enables a faster processing of the tester's search and display functions.

2.2.3 Dummy Wheel

The dummy wheel tests the function of the rail contacts. The description of the dummy wheel's use is in the chapter adjustment of the detection point.

If measurements require the dummy wheel, a request is given in the display:

SK 1 

The user is asked to lower or to lift the dummy wheel. After the affirmation the measurement starts.

2.2.4 Measurement Adapter

The real measurement takes place in the measurement adapter. It is connected directly with the detection point's connection plug board (at EAK30K the contact between measurement adapter and detection point is realized with help of the EAK-Adapter plug, which is included in the delivery). A connecting cable of 3m length enables the user to take the display unit to the rail contacts. Also, it facilitates the adjustment of both rail contacts (with the dummy wheel).

A specific cable set, depending on the detection point type, is connected to the measurement adapter to measure the supply voltage and rail contact voltage.

2.2.5 Cable Sets

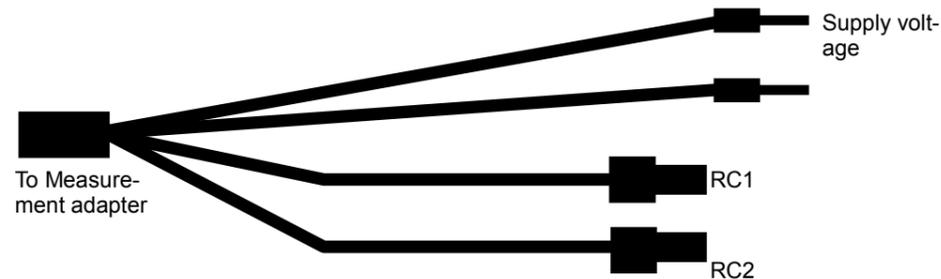
A diverse construction of the different detection point types requires certain cable sets to start the tester at the detection point to be measured.

Cable Set 1 for EAK30 / EAK30S / EAK30C / RSL



The fourfold-plug for SK1/SK2 consists of 4 cluster contact plugs. Please note, that there will be mismeasurements in case of mixing the polarity. The plugs got corresponding names (e.g. EAK 30: mess 19 20 21 22). The double plug for the supply voltage consists of 2 cluster contact plugs. The anode (e.g. EAK 30: clamp 1) is color-coded.

Cable Set 2 for EAK30C-NT / EAK30H / EAK30K / EAK30CA-2



Each of the two double plugs RC1 and RC2 has two plugs of 2 mm. These have to be connected to the adapter sockets linked before. The two single plugs for the supply voltage / modem transmitter level consist of a 2 mm plug each. Those, too, have to be connected to the adapter sockets linked before. Please note, that there will be mismeasurements in case of mixing the polarity.

For the measurement connect the adapter sockets with the referring test openings of the detection point's clamps (see figure) for the supply voltage and rail contacts SK1 and SK2 (see adjustment of detection point).

Some examples are shown in the connecting variants from page 28 onward.

5.1.3 Adjustment Mode

Only the monitoring voltage (PEGUE) and the received voltage (MESSAB) of a rail contact can be measured and displayed in the adjustment mode.

The rail contact can be selected with the button "SK1/2".

To select the displayed measurement voltage, choose the button "PEG/MESSAB". The selected voltage is shown in the display. This value can be stored with  (left, lower corner in the display). When switching to another voltage or lowering the dummy wheel, the new result can be compared with the stored value.

When choosing "PEG" right after "MESSAB" the deviation between the results "MESSAB" and "PEG" are shown in percent.

Press  to leave the adjustment mode.

Attention!

There will be no comparison with the limit value; the measured data will not be stored.

5.2 Broken Wire Detection

The broken wire detection is carried out at ZP 30C-NT only. It is realized before the first measurement in the automatic or manual mode takes place. The user is asked whether he wants to realize the broken wire detection. Press  to skip the broken wire detection.

After starting the broken wire detection the user is asked to disconnect one lead of the receiver head. Thereby, the display shows the voltage *MESSAB*. If the voltage is not within the tolerance of $-(20 \dots 30)$ mV, the value flashes. In this case the user can regulate the value on the related potentiometer.

The function of the broken wire detection can be tested by the correct flashing of the corresponding LED's. Press  to transfer the value in the protocol. The second receiver head requires the same procedure.

5.3 LED Query

The LED's condition of some detection point types needs to be mentioned in the protocol. Therefore, the LED query, divided in "evaluation" and "adaptation", will be displayed after finishing the electric test.

Next to the LED's name is the correct status given (off, on, flash). The cursor flashes on the first position. If the LED function is alright, affirm with . Automatically, the cursor switches to the next position.

If a failure notice occurs, switch to the next position with help of the button down left, **without pressing **.

All entries are stored in the protocol.

It computes as follows:

Example:

| | |
|--|---------------------|
| MESSAB _{without dummy wheel} | = 200 mV (positive) |
| MESSAB _{with dummy wheel} | = 230 mV (negative) |
| Total travel = MESSAB _{positive} + MESSAB _{negative} | = 430 mV |

The open-circuit voltage is to be set to:

| | |
|--|-----------------|
| MESSAB _{new} = Total travel / 2 | = 430 mV / 2 |
| | <u>= 215 mV</u> |

This voltage can be set with a lowered dummy wheel. After the setting the value has to be affirmed. When lifting the dummy wheel the present reference value is displayed again. Additionally, the deviation of the difference between MESSAB_{lowered} and MESSAB_{not lowered} from the total travel are shown in percent. After the affirmation the unit switches back to the automatic mode.

A deviation of 20% as maximum is tolerable. It computes as follows:

| | |
|---|-----------------|
| maximum deviation = Total travel * 20 % | = 430 mV * 0,20 |
| | <u>= 86 mV</u> |

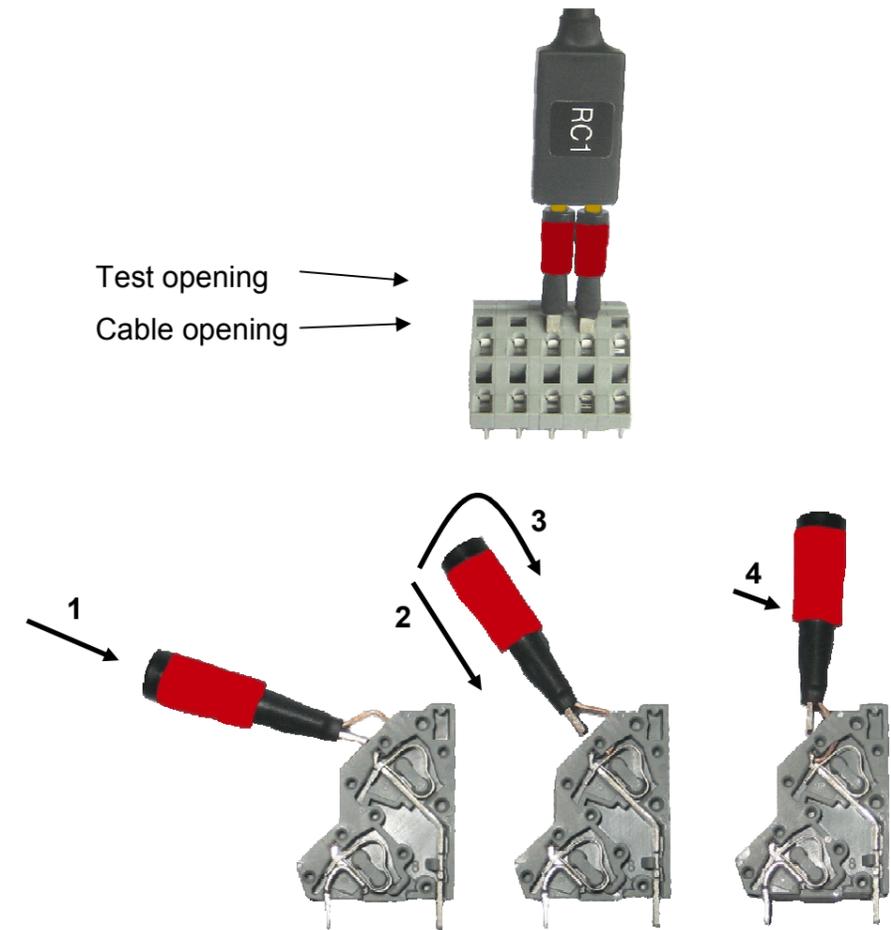
This means that both voltages, MESSAB_{lowered} and MESSAB_{not lowered}, may differ over a maximum value of 86 mV (equivalent to 20 %).

Set PEGUE

The monitoring voltage (PEGUE) and the detection point number appear in the display. The reference value MESSAB_{without dummy wheel} and the deviation in percent appear in the display's bottom. The monitoring voltage can be set to the shown value and is transferred to the protocol by affirmation. After the affirmation the unit switches back to the automatic mode.

5.1.2 Manual Mode

The tester starts at the first testing point of the present measuring sheet, but does not switch to the next point automatically. The user can switch to any testing point via the two buttons at the bottom. The measurements are carried out continuously leading to a permanent update of the displayed value (real multimeter operation). When deviating from the limit values, the measuring result flashes. After finishing the "last test point" (number of test points depends on detection point type), it starts again with test point "1". Only by affirming with ↵ (possible at any time), the query of the LED-status is shown (depends on detection point type). After pressing ↵ again, the user is asked if he wants to store the data. Once affirmed the measured results are saved to the memory card even one has not done all tests points.

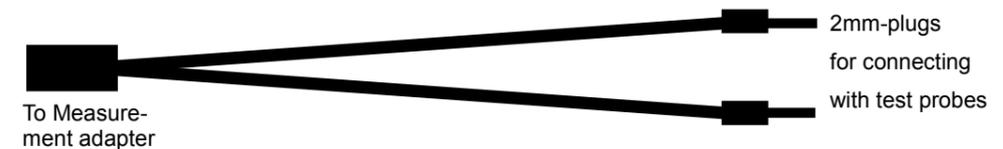


After the plug in (1) the adapter socket is steadily pushed backward in the direction WAGO-clamp (2 + 3) until it locks (4).

The specific form of the adapter socket assures that a releasing of the connecting cable is impossible.

Once the adapter socket is locked, it can be left in the detection point housing for future measurements. More adapter socket sets can be ordered using the order number "110012".

Cable Set 3 for EAK30C-NT / EAK30H / EAK30K / EAK30CA-2



Connect the two single plugs with the supplied test probes. Now you can contact the responsible measuring position. The display guides you through the measuring procedure and tells you the position and when to connect.

2.3 Used Icons

The Tester SICO 2049 operates menu-driven. Each of the four buttons has specific meanings which are shown in the display:

| | |
|---|---|
|  | Affirm entry |
|  | Back (upward in menu) |
|  | Cancel selection / entry |
|  | Selection, upward |
|  | Selection, downward |
|  | Selection, to the left / previous measurement |
|  | Selection, to the right / next measurement |
|  | Save the displayed value |

If required more icons can be shown on the bottom of the display:

| | |
|---|--|
|  | Battery low |
|  | Access to memory card |
|  | Wait for answer of measurement adapter |

Following big icons can flash in the display:

| | |
|---|--|
|  | Automatic shutdown mode (see 2.5 Power Supply) |
|  | Low voltage, (see 2.5 Power Supply), Change batteries! |

5 Measurements

You can choose from three different measuring modes:

1. Automatic
2. Manual
3. Adjustment mode

5.1. Realizing Measurements

5.1.1 Automatic Mode

The tester measures consecutively all voltages being selected by the chosen detection point variant and according to the valid measuring record. Then, the measuring results are compared with the stored limit values. If the tested voltage is within the allowed limit, the measurement continues. A deviation causes the test's abort and the user has to give an affirmation. In the meantime, the deficient result flashes. Before measuring with the dummy wheel the user is asked to lower or lift it. After the user's affirmation, the testing is continued.

If adjustable voltages deviate from the reference value, it switches to the window "set" *MESSAB* or "set" *PEGUE* after the affirmation. After the adjustment the measurement can be continued in the automatic mode.

Attention!

Please adjust *MESSAB* and *PEGUE* in the window "set". If the adjustment is made during the flashing of the measurement result, *MESSAB* and *PEGUE* are set to the tolerance limit.

The deficient and adjusted measurement results are written down in the protocol and with it modifications are kept in the documents. **There will be no evaluation of the adjusted results.** Afterwards, the measurement continues in automatic mode.

After the completion of all measurements, the query of the illuminating diode's conditions is shown (depends on type of detection point). With the button ✓ the mandatory status is affirmed line by line. If a status does not apply (failure), the next line can be selected with ↓, (see chapter 5.3 LED Query).

Finally, all measuring results are stored on the memory card. After the successful storage, the test protocol's name appears in the display.

Note: Wheel sensors can be selected in manual or adjustment mode only, since the selection of sensor 1 or sensor 2 depends on the position of points.

Set *MESSAB*

The received voltage (*MESSAB*) and the detection point number appear in the display. The reference **value** (*MESSAB_{new}*) appears in the display's bottom. The voltage *MESSAB* has to be set to this value.

4.4 Additional Functions

Memory card

In the menu “Memory“ you can delete the memory card’s protocols and directories. It can get necessary after you have reached the maximum of directories on the memory card but have no opportunity to store the data on a computer.

Delete data

You can select and delete single measurement data. Please note, that you will delete the data irrecoverable. Store the protocols on your computer regularly.

Delete directory

You can delete an empty directory only.

Brightness

You can set the brightness of the background light. Please note, that setting the brightness too light causes higher battery consumption.

Temperature

The temperature is shown when the measurement adapter is connected. A note appears when the adapter is not connected.

Batteries

The battery charge condition is shown. When the charge condition is low, please take additional accumulators or batteries with you.

Limit values

In the tester all measured data is compared with the stored limit values which correspond with the valid test sheet. Deviances will be marked.

Limit values should be compared regularly with the protocol values since it occurs that *Thales* modulates them.

In case you need to update the stored limit values, please follow the instructions described in chapter 9 Revising the Limit Values.

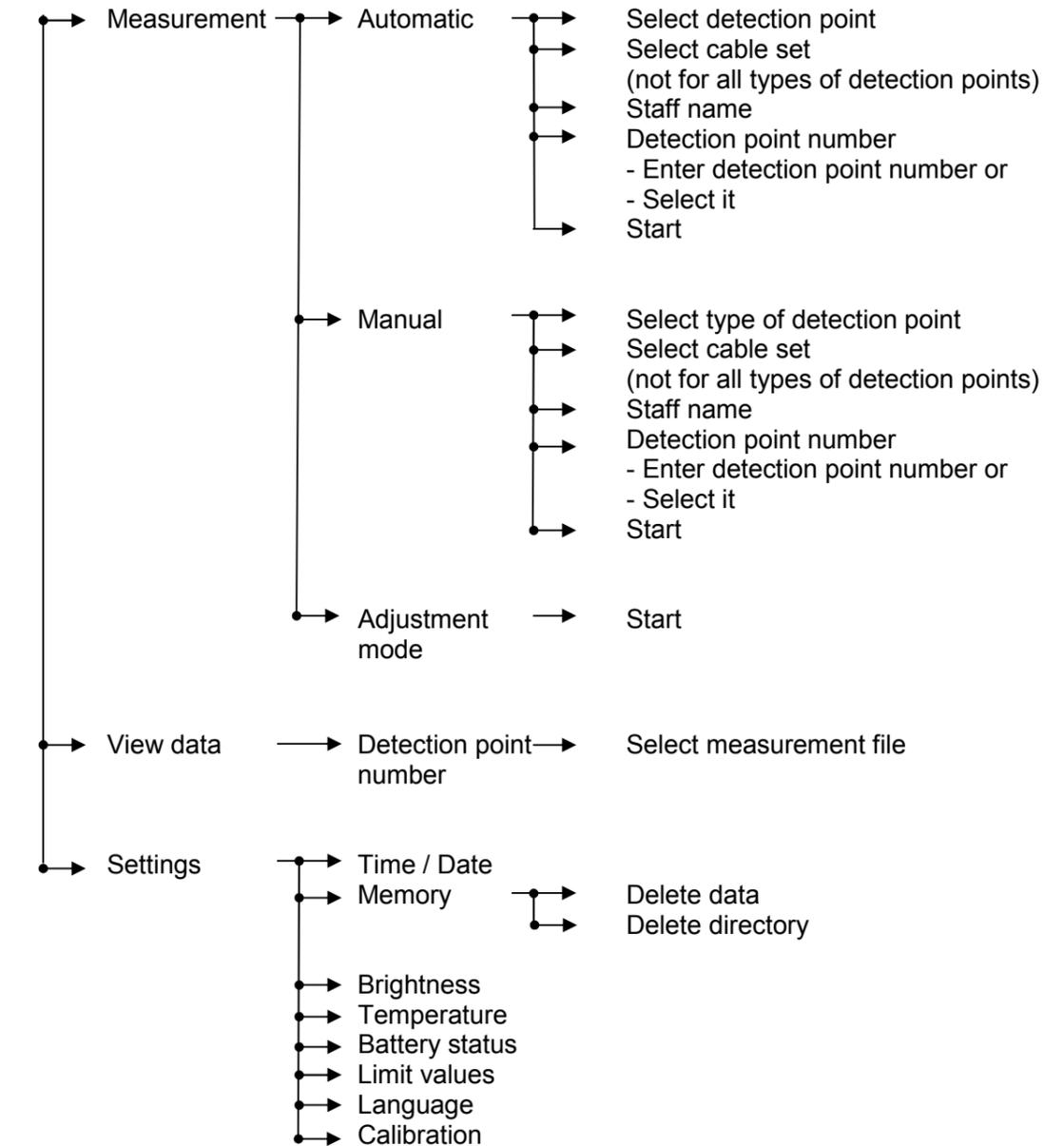
Calibration:

The displays unit’s present software condition is shown.

If a measurement adapter is connected, the last calibration date and its present software condition are displayed.

2.4 Structure

ON



2.5 Power Supply

Two rechargeable NiMH-batteries (type C, included in delivery) supply the tester with power. The display unit has an internal calendar circuit with an additional energy source. When changing the batteries, date and time do remain for one week. Just when switching on the unit for the first time or storing it without batteries over a longer period you have to set date and time.

Note: Rechargeable batteries are eco-friendly, but lack capacity in extreme cold temperatures. In this case, we recommend carrying normal batteries with you.

When using batteries, please use alkali-manganese batteries (LR6 or LR 14) only. They have a higher capacity and a wider temperature range than zinc-carbon batteries (R14).

Insert batteries:

Unscrew the left-hand side's cover on the display unit's back. Insert one after another the batteries with the negative pole first and lock the cover.

Undervoltage detection:

If the battery is low, the battery icon will show up at the display's bottom. Measurements are still realizable for a certain time. We recommend changing the batteries after the present measurement.

To avoid an exhaustive discharge of the batteries, the display's battery icon flashes at a certain battery voltage. The unit shuts down automatically. Please change the batteries immediately!

Date and time will remain.

Automatic shutdown mode:

The unit has an automatic shutdown mode to enable long-term availability which depends on the battery charge condition also. When not pressing a button within five minutes, a flashing icon appears in the display. Next, the unit shuts down automatically when not pressing a button within a minute.

Note: Please remove batteries from the battery compartment when you plan to store the device for a longer period.

2.6 Maintenance

It is recommended to clean the device after use with a damp, solvent-free cloth.

2.7 Transport and Storage

To protect the tester from dust and dirt as well as from shakes, use the supplied transport case for transportation.

Storage should be in a cool and dry place.

Detection point number

The displayed selection gives all generated detection point directories of the memory card. Select one of the numbers or enter a new one by selection "new ZP". Afterwards, the main menu appears.

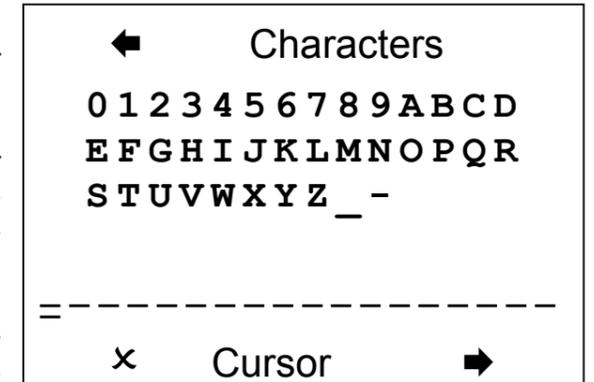
Data entry

To enter data you have to use the cursor. Names, counting point numbers or any other data will be entered via the window shown on the right-hand side.

The selected character flashes in the upper part. The two buttons at the top can change the characters. The selected character will be displayed at the bottom. To move the cursor, use the buttons at the bottom.

To cancel the entry, move the cursor to the left-hand side. The icon \times appears. A further press of the button down left cancels the entry.

To affirm the entry, move the cursor to the right-hand side. The icon \checkmark appears. A further press of the button down right affirms the entry.

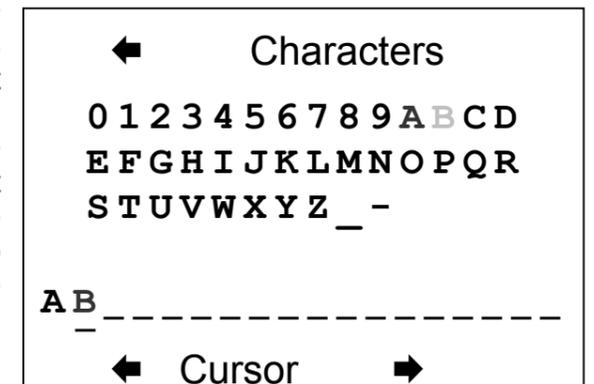


Entry example:

With help of both upper buttons select the character 'A'. The selected character flashes and additionally appears in the bottom line at the position of the cursor.

Next, press the button down right and move the cursor to the next position. Now you can select the next character by using the buttons at the top. To affirm the character, move the cursor to the next position. After you have finished the entry, move the cursor to the right-hand side. Affirm with \checkmark and the entry is completed.

To cancel the entry, move the cursor to the left-hand side. Affirm with \times and the entry is canceled. The entry will not be stored.



4.3 Shutdown of the Unit



Press this button for 3 seconds to shutdown the unit. A shutdown is always possible.

4 Functions

4.1 Settings

In the menu „Settings“ you can set

- Time / Date,
- Limit values,
- Brightness or
- Language.

Furthermore, you can query for

- Temperature and
- Date of the last calibration.

4.1.1 Time / Date

The display shows date and time. If you wish to change them, press the button “change“. First you can choose the *day* with help of the cursor. Affirm the day with ✓. Afterwards you choose *month*, *year*, *hour*, and *minute* in the same manner. The entry ends with the affirmation ✓.

4.1.2 Language

Several languages are available. If you want to change the set language, please contact Signal Concept GmbH.

4.2 Entries

Selection of detection point

The selection appears after starting a measurement in “automatic“ or “manual“ mode. Select one of the displayed detection point types and affirm with ✓. For the following measurement all required test points and their corresponding limit values are on-hand.

Selection of cable set

The selection appears after choosing the detection point type. Measurements on EAK 30C-NT, EAK 30H, EAK 30K and EAK 30CA-2 can be carried out with cable set 2 or 3. The use of cable set 2 requires the adapter sockets, which have to be plugged in the corresponding EAK. Taking cable set 3 means to contact the responsible measuring positions with the supplied test probes. The display gives you a demand.

Staff name

The name of the last user is shown. To change this name, select “name“ with the cursor and affirm the entry. The menu appears. Enter a new name.

3 Start-up

3.1 First Steps

Your SICO 2049 will work correctly when you follow the steps in this manual and mind the notes.

- Insert memory card (unit has to be switched off)
- Insert 2 batteries (type C, mind polarity, see 2.5 Power Supply)
- Connect measurement adapter with front socket of display unit
- Connect corresponding cable set (depends on detection point type) with measurement adapter

Afterwards:

- Connect cable set with corresponding terminals of the detection point
- Connect measurement adapter with connection plug board of detection point

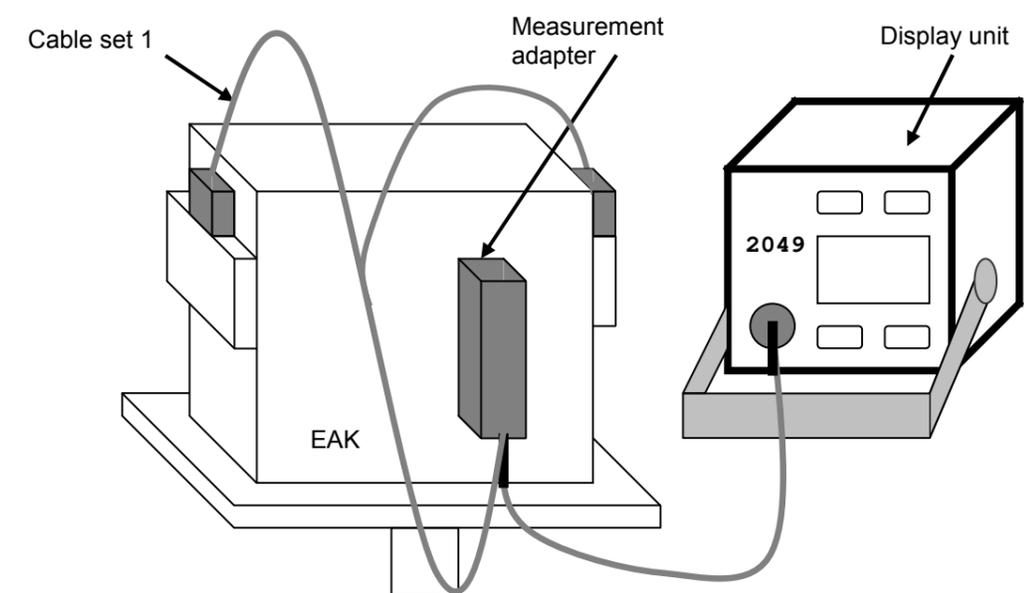
Press the button “On“. While the unit’s name appears in the display, the memory card and measurement adapter’s functions are tested.

A warning appears when the memory card is not inserted. Measurements can still be realized, but not stored. When inserting batteries for the first time after a longer period, you have to set date and time (see 4.1.1 Time / Date).

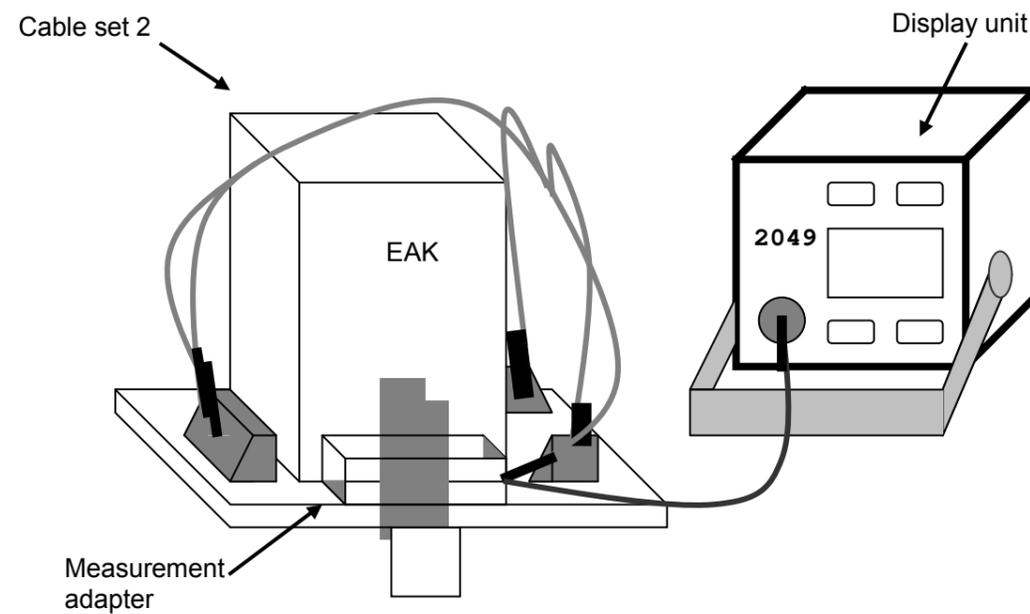
Afterwards the menu appears.

3.2 Connecting all Parts of the Device

Connecting to EAK30, EAK30S, EAK30C, RSL with Cable Set 1



Connecting to EAK30C-NT, EAK30H, EAK30K, EAK30CA-2 with Cable Set 2



After the realization of the required measurements given in the test sheet, the measured data is stored in the directory of the chosen detection point. Faulty measured data identified during the measurement, is marked with “F” in the protocol. Also the protocol is marked with “F”.

Calibration:

The calibration of the rail contact should be realized in the adjustment mode.

Dropout test:

The ZP 30C-NT realizes the dropout test and the broken wire detection during the automatic or manual testing.

In case of new installation or modification we recommend choosing the adjustment mode for the dropout test.

Connecting to EAK30C-NT, EAK30H, EAK30K, EAK30CA-2 with Cable Set 3

- Select the measuring mode with cable set 3.
- After the message on the display, contact the named measuring position of the detection point with the test probes.
- The measured value on the display affirms that the test probes have made a successful contact.
- Please affirm the contact.
- The same measuring value appears and is compared with the limit values.
- Do not take the test probes off the detection point since the measurement has not been finished yet.
- As soon as the next measuring position is displayed, you can take the test probes off the detection point.

3.3 Measurement

Measurements can be realized directly after switching on the unit. In the menu the cursor marks “measure”. Affirm with the button ✓.

Following entries still have to be made:

- Select the measurement mode: Automatic, Manual, Adjustment mode
- Select the detection point (except adjustment mode)
- Affirm your name or enter your name
- Select the detection point number or enter the detection point number
- Affirm “Start measurement”, measurement begins